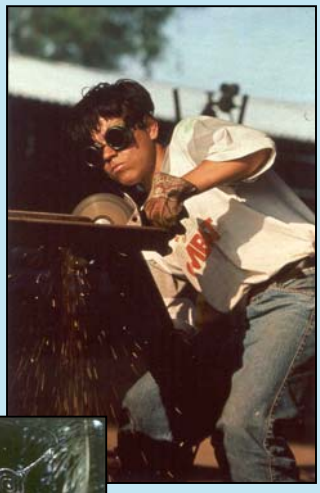
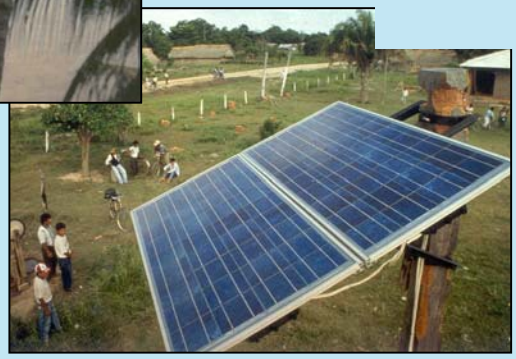
Cooperative Development Case Studies

Report





Submitted to

USAID/PVC

by

NRECA International Ltd.

Cooperative Development Program
Case Studies

Cooperativa Rural de Electrificación, Bolivia
Comilla I Palli Bidyut Samity, Bangladesh

Prepared for
U.S. Agency for International Development
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EXECUTIVE SUMMARY

As a cooperative development organization with over 40 years experience establishing electric cooperatives and associated organizations overseas, NRECA International, Ltd. (a wholly-owned subsidiary of the National Rural Electric Cooperative Association - NRECA) has a proud history. For the present, the United States Agency for International Development (USAID) initiated examination of what makes a cooperative development experience successful and what lessons can be applied elsewhere, NRECA selected two cooperative case studies Cooperativa Rural de Electrificación (CRE) in Bolivia and Comilla I Palli Bidyut Samity (Comilla) in Bangladesh.

In the first case study, CRE is a cooperative that emerged to meet the electric service needs of a large urban area that were not being met by either government or the private sector. This is a "bottom-up" story where CRE was formed by the community and has grown to be the largest electric distribution utility in Bolivia. The second case study is an example of a large government program where electric cooperatives where planned, tightly controlled and regulated by a central authority. This is a "top-down" story where Comilla was created along with several other cooperatives to meet the electrification needs of the rural poor in a way that other government agencies could not effectively accomplish.

While the two case studies reflect different approaches, both show a similar success suggesting that whether it be government initiated or established by the community, the goal of rural electrification via the cooperative structure is successfully accomplished given the presence of certain key factors.

The goals of the people and organizations that established CRE and Comilla in both cases were to bring reliable and affordable electricity service as a way of increasing the quality of life, facilitate the growth of the economy and increase income, and allow the community to control its own public service destiny. These goals were in large part accomplished and continue to be the overall mission of both cooperatives today.

Lessons learned in the process include: first, the fundamental importance of leadership and community involvement; second, the project must be economically feasible, likely with a dense load center; third, the project must have sufficient and low-cost financing; fourth, the application of hands-on experience and advice (including standardized and proven engineering and design) is critical to the cost effective construction of the electric system; and fifth, the focus of the project must always be the consumer-owner and the organization and management of the cooperative must stick to the principles of democratic control. This final point includes an on-going member outreach effort as well as regular rotation of the cooperative leadership.

The success of the electric cooperative is a prerequisite to and facilitator of social and economic change. In both case studies significant gains were noted as impacts of the project in employment, income and quality of life. Also, in both cases the cooperative business model was employed because neither government nor the private sector was effectively, if at all, serving the needs of the community.

The cooperative model allowed for the creation of a democratic and autonomous organization dedicated to serving consumer-owners and educating and empowering people at the grass-root level. Winning the confidence of the community required organization, good governance, motivation, trust, and dedication. Once the project established a buy-in from the community then the force of the many began to operate towards a common goal. Strong community leadership, a spirit of dedication to serve, and the absence of profit motive are integral components of the cooperative business model, and represent a motivation to accomplish formidable goals that can be lacking in government or private sector entities.

The future application of the cooperative business model to electrification projects should therefore begin with realistic and experienced planning. Key factors to consider in such planning include whether a feasible load center exists, whether local leadership and vision exist, whether the principles of a democratically operated business can synch with local culture, whether affordable project funding and expert advice is available, and also whether the operating environment enables the cooperative to become firmly established without predatory interference from competing interests, on one hand, and on the other hand, whether the local population perceives that forming a co-op is the best and perhaps only way to meet their energy service interests.

LIST OF ACRONYMS

ACRE	Area Coverage Rural Electrification
AGM	Assistant General Manager
CDO	Cooperative Development Organization
CRE	Cooperativa Rural de Electrificación
DESCO	Dhaka Electric Supply Company
DESA	Dhaka Electric Supply Authority
DGM	Deputy General Manager
ENDE	Empresa Nacional de Electricidad
GOB	Government of Bangladesh
kW	Kilowatt
kWh	Kilowatt Hour
MIS	Management Information System
MW	Megawatt
MWh	Megawatt Hour
NRECA	National Rural Electrification Cooperative Association
OCDP	Overseas Cooperative Development Program
PBS	Palli Bidyut Samity
PDB	Power Development Board
PGCB	Power Grid Company of Bangladesh
POD	Power of Diversity
PTA	Performance Target Agreement
REB	Rural Electrification Board
REP	Rural Electrification Program
RPC	Rural Power Company
USAID	United States Agency for International Development

PART I: THE IMPLEMENTATION PROCESS

The report begins with a description of the project implementation, including the conditions and events that brought about the need for the cooperative, how and why the cooperative was formed, and the impact of the project.

1.1 Project Description

CRE – Cooperativa Rural de Electrificación (Santa Cruz, Bolivia)

In the early 1960's the population of Santa Cruz, Bolivia and its immediate environs was approaching 100,000 persons, and although fairly densely concentrated, the community had little in the way of public utility services. The city streets were unpaved, and potable water, sewer, telephone, and electric services were poor if they existed at all. The electric plant dated back decades and included four diesel generation units totaling 1,275 KW and several thousand residential service drops around the central plaza. The electric system changed ownership between private, state and municipality entities and was never properly maintained and only offered low quality electric service. The capacity of the system was negligible to handle the demand of the community, and there were serious voltage fluctuations resulting in low illumination in houses and frequent damage to motors in businesses. Without reliable public services, especially power, the few industries that existed had to meet their electricity needs with self-generation. Although the economy was growing, employment opportunities were limited and significant poverty existed in the community.

By the late 1950's and early 1960's, a group of community leaders coalesced around the theme of taking public service matters into their own hands. Frustrated by the lack of action from the municipality, the state or the national government, and the absence of any private company willing or capable of providing services, the leaders decided that a member-owned cooperative was the best, and indeed, the only solution. They believed that government entities were too poorly administered to resolve the electricity problem and that a private company with profit motivations could not provide electric service that would both reach to the rural areas and be affordable.

The leaders of Santa Cruz first organized a telephone cooperative and then set their sights on forming an electric cooperative. (As a note to the historical context, the telephone cooperative was founded in 1960 and it began operations in 1963. Following the 1962 founding of the electric cooperative, the community founded a water utility in 1965 which began operations as a cooperative in 1979.) In 1961, one of the community and cooperative leaders, Augusto Bernal, attended a conference in Bogotá, Colombia where he met NRECA's General Manager, Clyde Ellis. The following year, under President Kennedy's Administration, the first USAID-NRECA cooperative agreement was signed, focusing on improving the standard of living in Latin America. The paths of Mr. Ellis and Mr. Bernal fortuitously crossed at a time when NRECA was developing projects and Santa Cruz was searching for assistance. Mr. Ellis traveled to Santa Cruz to see the area first-hand and agreed to help. Later in 1962, a group of community leaders in Santa Cruz founded the Cooperativa Rural de Electrificación (CRE). Among its initial board

members was Luis Terrazas, who would lead an eight-year battle against the national government before CRE was to begin operations.

At the time, the Bolivian government believed that public services were a strategic public good and should not be in the hands of private companies or cooperatives. Apparently, permission for starting a telephone cooperative in Santa Cruz was granted only because the national government did not believe it could be done. However, the success of the telephone cooperative changed that perception and the government refused to allow Santa Cruz to start an electric cooperative. Yet at the same time, the success of the cooperative model fueled the stubborn determination of the people of Santa Cruz that an electric cooperative was the only way to bring "lights" to the community.

If it were not for the strength of character of the original board, and the leadership it represented in the community, the struggle to start the electric cooperative might have been abandoned. The original board (combined administrative and audit boards) of CRE was composed of three industrialists, three engineers, two lawyers, and one accountant and all had strong connections with the Mayor and local political, civic and business institutions. The cooperative also waged a continuous and comprehensive public awareness campaign through the radio and newspapers, as well as working with local and national opinion-makers.

The cooperative raised initial organizational capital through the sale of memberships. The first membership drive was a well-organized, one-day event in which 300 volunteers walked the streets soliciting interest. As an indication of the pent up demand and community enthusiasm, over 5,000 members were signed that first day. Gulf Oil Company, with existing operations in the area, was among the first members of the cooperative and the company contributed $1,000.

The leaders of CRE convinced the director of USAID and the U.S. Ambassador of the need for the electric cooperative and they approved in concept a low-cost, long-term loan. However, the Bolivian government continued its opposition, which rose to such a heightened level that at one point, an NRECA advisor was asked to leave the country. The U.S. Ambassador suggested that the Bolivian government and CRE would have to resolve their dispute before the U.S. Government could proceed with project financing.

The two sides could not come together but outside events changed everything. In 1964, the Bolivian national government collapsed and the new government was more receptive to CRE. In December of 1965, the Bolivian government provided CRE the legal authorization to operate an electric service concession in five provinces of the Department of Santa Cruz.

These actions cleared the political path for CRE and its leadership immediately focused on the tasks of qualifying for USAID financing, organizing the initial membership of the cooperative, performing engineering and business planning, and preparing for operations.

The year was 1966 and the dream was an electric system that would power the economic growth of the Santa Cruz, a cooperative that would reach out to the countryside and lift a people out of poverty. Founders of the cooperative recall their belief that houses could be lit with candles but that industry could only be powered by electricity. They knew that serving an industrial base would make the cooperative feasible and establish an institution that would forever change the lives of everyone in the community.

Comilla I Palli Bidyut Samity, Bangladesh

The need for a rural electrification program in Bangladesh was conceived after the devastation caused during the liberation war in 1971. The war brought a total halt to power development in Bangladesh. Closure of businesses throughout the county reduced demand for power to historical lows. After the war, the country's generating capacity remained at 420 MW but peak demand was only 266 MW. Because of this excess generation capacity, the Government of Bangladesh decided to develop a rural electrification program to improve the agricultural potential of the county. In 1971, the Government of Bangladesh accelerated the concept by issuing a directive to the Power Development Board (PDB) to provide electricity to the rural areas of Bangladesh. But it was soon realized that a countrywide electrification program was too large a task for the PDB.

In October 1976, PBD entered into an agreement with NRECA and Gilbert Commonwealth Inc. to conduct a comprehensive feasibility study on implementing a rural electrification program in Bangladesh. Financed by USAID, the study was completed in June 1977. The report's primary recommendations were: (a) Bangladesh should phase in an Area Coverage Rural Electrification (ACRE) program to ensure availability of reliable electric power to all rural areas of the country in order to improve the social-economic conditions of the rural multitudes; (b) each rural electrification project should establish a Palli Bidyut Samity (PBS) i.e. electric distribution cooperative; and (c) in order to facilitate organization, administration, financing, and performance monitoring of each PBS, an independent rural electrification agency should be established by the Government. Each PBS would be based on the cooperative principle of consumer-member ownership to ensure maximum participation of the beneficiaries and democratic governance.

On October 29, 1977, by Presidential Ordinance, the Rural Electrification Board (REB) was established to implement the ACRE Program based on the cooperative concept and modeled after the rural electrification program in the United States. The newly established REB commenced operational activities on January 1, 1978. Strategically, REB set out to ensure economic viability of each PBS, by establishing consumer-member participation in daily operations, providing technical assistance for determining the priority and economic soundness of construction projects, designing financial supports under a no-loss, no-profit principle, and development of affordable rate tariffs for rural consumers. Specific management and operational functions REB performs are: organizing activities relating to institutional development, system design, manpower training, policy designs, instructional assistance in all areas of operation and management, funds for system development, and providing liaison between PDB, Dhaka

Electric Supply Authority (DESA), Dhaka Energy Service Company (DESCO), and other concerned government agencies.

In 1978, a long-term technical assistance partnership was formed between REB, NRECA, and USAID. Through the years, this unique partnership has demonstrated its usefulness in the areas of promoting the cooperative concept, development and operation of physical assets, and enhancing administration and organizational functions required for program sustainability. The positive steps and progress of the program over the years has attracted support from numerous others in the donor community. The combined contributions to the rural electrification program by all donors (currently at 16) and the Government Of Bangladesh now stands at $1.2 billion. The Bangladesh rural electrification program has been identified as one of the most successful institutional development efforts in South Asia.

Comilla was organized and registered as a Rural Electric Cooperative (REC) in May 1979. Originally, thirteen PBS's were established extending North, South, and West from the capital city of Dhaka. The main power supplier for REB is the government owned Power Development Board (PDB) that serves the capital city of Dhaka. Design recommendations called for each new PBS substation to be located near densely populated areas and close to PDB's 33KV transmission grid.

Comilla is located approximately 70 km South of Dhaka near the border with India. The area at the time was primary agricultural and blessed with good roads and major waterways. The history of Comilla is one of political activism and having a 60 percent literacy rate, one of the highest in the country. Comilla's service area encompasses 1,711 square km.

USAID funding for the first thirteen PBS's was $50,000,000. This was of course fundamental in that necessary resources and equipment were never a problem. The objectives of the rural electrification project were to build load centers, i.e. electrical substations, in densely populated areas having good transportation and communication systems. The load centers themselves were to be located as near to PDB's transmission grid as possible. In most cases a distance of less that 1-2 km of new transmission line was required to be constructed to energize a load center. Comilla designed its initial system requiring three electrical substations, two sized at 5MVA and one at 10MVA. Today there are eight substations with a system capacity of 65 MVA and a present day peak demand of 43 MVA yielding an efficient system load factor of 66 percent. Just as important as system design was the selection of REB's first Chairman, Brig. Sabih uddin Ahmed, who instilled the non-technical objective of the program: serve the people and let them know they are the owners.

Strategies employed during the early days of the project focused on two areas. First, motivating the rural masses into joining an electric cooperative, and secondly, requiring strict adherence to established business practices and policies. Another critical strategy was the decision to use consultants for technical assistance. This resulted in consultants and local staff sharing experiences and learning together. These strategies blended well

with the cultural norms and diversity of Bangladesh and the intended beneficiaries. Expected results from the project were to serve the people with reliable and low cost electrical energy, in the belief that bringing electrical energy to rural people would cause a fundamental positive change in their social and economic lives.

1.2 Project Implementation

CRE

As the political battle with the Bolivian government waned the implementation phase began with a comprehensive organizational, planning and financing period that lasted about three years. The ultimate project goals were to electrify not only the town of Santa Cruz but also the outlying rural areas. NRECA sent from its US cooperatives several advisors, key of which was Cecil Viverette. Mr. Viverette performed a feasibility assessment and described an $8-10 million project that would essentially scrap the failing existing system and in its place install a 15,000 KW gas turbine and construct a new distribution system.

Although the political leadership in the Bolivian government was now more predisposed to the idea of an electric cooperative, many of the bureaucrats in the government agencies CRE had to deal with were unchanged. Eventually a compromise between CRE and the Empresa Nacional de Electricidad (ENDE) was crafted in which ENDE would control the project electricity generation and CRE would be responsible for its distribution. Further, the USAID loan would pass through and be administered by the national government.

Before accepting that ENDE would control the generation CRE insisted on several conditions requiring that: a) the books of both ENDE and CRE remain open to each other at all times; b) all ENDE profits from the sale of wholesale power to CRE be reinvested in the Santa Cruz area; and c) that ENDE take all actions necessary to meet all the power requirements of CRE, and if failing in that commitment CRE would be authorized to provide for their own generation.

Along with the engineering feasibility study by NRECA, CRE performed a socio-economic survey and developed operational, rate, and financial plans. The ten-year plan envisioned over 36,000 residential connections serving a population of 174,000, almost 60 percent of which was considered rural at the time. About 100 commercial connections and nearly 50 large power users were identified with an estimated demand requirement totaling over 5,000 KW. The large power users included the railroad, oil refineries, tile plants, sawmills, sugar mills, rice mills, and cotton gins. Based on the advice of NRECA rates for industrial loads were set lower than residential services, in line with their respective costs of service and as a way to encourage industrial usage and economic growth.

As construction of the system and operations were about to begin the Board clearly recognized its role as the policy and governing body and immediately sought to hire a professional staff. The first three hires were the General Manager, Administrative Manager, and Technical Manager. The Board made a great effort to locate the best talent

available and conducted an extensive interview process to ensure dedication to the project. A decision was made to structure a lean operation and avoid a large bureaucratic organization. Consistent with this strategy construction was bid and contracted locally, including the fabrication of cement poles.

CRE and NRECA developed, designed and detailed line routings and construction plans, taking advantage of existing roads. The geography of the area is relatively flat which facilitated the construction of the distribution system, and the availability of low cost natural gas ($0.20/million BTU, nominal) provided for cost-effective generation. These factors along with the dense population center, the existence of industrial load and low-cost financing were critical components of an economically feasible project.

Hurdles were confronted during project implementation, and solutions were found, from finding borrowed office space to finding economical equipment delivery routes. Bolivia is a land locked country with mountains, jungles and long distances and at the time formidable barriers existed to transportation and communication. Many of the materials and supplies destined for CRE had to be airlifted during construction.

Service quality was also a challenge. In the first year of operations an analysis of outages found that 62 percent were due to defective construction. Another 10 percent were ENDE generation issues and the remaining 28% were distribution faults for diverse reasons. The system was growing exceedingly fast and in order to meet the demand while maintaining and improving service quality the staff of CRE grew to 53 persons (including seven in district offices) by the end of the first year of operations. Given that the cooperative was attending over 10,000 customers with double-digit growth and without the aid of any computerization, this was still a lean operation.

Other problems existed including serving the large power customers who for the first time had access to essentially unrestricted electric power. The old transformers industry had been using were faulty and special equipment was ordered allowing for high voltage service connections. The cooperative estimated that 30,000 KW of industrial self-generation existed most of which was targeted for replacement by lower cost and more reliable CRE power.

At the end of its first year of operations CRE nearly broke even financially. It viewed its three most important challenges as: 1) increasing the efficiency of electric service; 2) extending the system within the capital expansion plan to those as yet unserved; and 3) maintaining the financial stability of the cooperative via strict budgetary and management controls.

In order to overcome the challenges it faced and accomplish the success it desired, the cooperative sought and gratefully accepted the advice of NRECA advisors, all of which were industry professionals with years experience at their own electric cooperatives in the US. During CRE's second year of operation a formal sister cooperative arrangement was agreed to with Blue Ridge Electric Membership Corporation, Cecil Viverette's cooperative in North Carolina. Assistance that began with the structured engineering,

operational and financial planning that NRECA provided during CRE's formation evolved over the years into a wide-ranging relationship.

As an example, a letter dated in May of 1975 from CRE to Blue Ridge requested that an expected visitor from the latter bring the following:

- Complete set of Blue Ridge's job and position descriptions;
- National Electric Code of 1975;
- Silent Sentinel Protective Relay Application manual by Westinghouse or similar;
- Transmission and Distribution Handbook by Westinghouse;
- One standard REA wooden brace with its metal ends to see if we can make it locally;
- NEMA, ANSI or AIEE Standards Catalog.

Over the years every conceivable aspect of managing and operating an electric utility has been discussed between the two cooperatives, and through other NRECA consultancy and training programs. Of course today CRE has grown to be the largest electric cooperative in the world, and a model of success. While the sister cooperative with Blue Ridge still exists CRE also lends a hand and advice to other developing cooperatives that seek its assistance.

The chart below lists key characteristics of CRE in its first year of operations and today.

	1970	Today
Members	10,875	276,000
Employees	53	588
Km Distribution Line	620	11,000+
Value Electric Plant (net)	$3,500,000	$61,821,000
MWh Sales	14,400	1,079,209
MW Peak Demand	8	228

Note: Energy Sales and Peak data for 1970 are approximate for first full year of operations.

Today CRE's customer base is 44 percent residential, 25 percent general and commercial, 26 percent industrial, and 5 percent public lighting.

As the cooperative's reaches further remote areas it has developed isolated systems -- small generation and distribution systems not interconnected to the central grid. To date CRE has constructed and operates six isolated systems in addition to the central interconnected system. The interconnected system serves 97 percent of the customer base and the isolated systems serve the remaining three percent.

Comilla

Implementation of the project started with selecting honest, devoted people who believed in the rural electrification program and were totally committed to the effort. This philosophy was institutionalized by REB's Chairman, Brig. Sabih uddin Ahmed.

Chairman Ahmed enjoyed the favor of then President Ziaur Rahman Bir Uttam, which was very beneficial to the rural electrification program in the early years. Chairman Ahmed was the first to see the wisdom of hiring women as a way to fully integrate the cooperative with the community. The Chairman's hands-on approach to the program and his motivational skills in getting people to organize and become aware of the benefits of electricity was critical to the success of the program. The first group of fifteen General Managers was selected in 1978. The Chairman's insistence that they have business degrees versus technical backgrounds proved a successful strategy in organizing the PBS's. Each General Manager was personally interviewed by the Chairman.

Another significant decision made in the very beginning of the REB program was to prohibit organization of the PBS employees by public employee unions. As in much of the developing world, public employee unions in Bangladesh are little more than political power bases for their leaders and havens for corrupt or incompetent employees. The REB decision not to permit organization of PBS employees is widely seen as one of the key factors permitting REB to retain control of the integrity of the program and of preventing its descent into the corruption that often marks government sponsored development programs.

Organizational activities for Comilla centered on policy formation, procurement of materials, and grass-root motivational meetings. To maintain discipline at the cooperative, policies were written covering technical, financial, and management issues. These policies were developed collaboratively with the help of REB, NRECA and Comilla staff. In total 175 policies were developed and categorized according to functions; i.e. technical design, financial control, and management policies. Each category has is own numbering sequence, technical design-100 series, financial control-200 series, and management policies-300 series. The simplicity and fairness of these policies guided the program during its infancy.

Procurement of materials at Comilla was critical in meeting new customer demand and expectations. Fortunately three things were working to the cooperative's advantage. First, the rural electrification program was sufficiently funded and equipment and materials were always in good supply. Next, there were good roads and communication systems to and from Comilla construction sites. Finally, actual construction the distribution system was targeted for densely populated areas.

Also important to successful project implementation were grass-root motivational meetings. These meetings were held in villages having a high population density and their location close to PBS substations. The purpose of the meetings was to inform the villagers what was coming and explain the useful benefits of electricity. Village advisors were selected to help facilitate the meetings. The village advisor was someone with educational preparation and a willingness to serve their community. Fifteen were selected, one per upa zilla, e.g. county. Often rumors of the danger of electricity had to be confronted at these meetings. For example, villagers heard from city dwellers that electricity kills. A heightened awareness of the safety of electricity and honest exchange of views helped eliminate people's fears and convinced them to join the new cooperative.

In addition, motivational meetings taught the employees of the cooperative how to properly communicate with customers. The salient value of motivational meetings was their ability to educated, inspire, and create of vision of a better tomorrow cooperatively, individually and communally.

Baseline data from the start-up stages of Comilla exists to some degree from the performance tracking Form 550. This form is a financial and statistical reporting document similar to Form 7 used by cooperatives in the United States. Use of Form 550 proved to be a disciplined and organized way for the General Manager and the Board to establish financial accountability in managing and operating the cooperative. As Comilla began to grow so did its need for better performance monitoring tools. REB and its cadre of technical consultants met performance monitoring, as well as technical and administrative needs of Comilla. This allowed the PBS staff to concentrate on taking care of the consumer.

Other important performance monitoring tools were soon developed that further enhanced the accountability of the cooperative. The first was the Management Information System Statement (MIS). This report differs from Form 550 in that it tracks growth in customers, villages connected, kilometers of electrical lines build, customers disconnected, and system losses, i.e. difference between electricity metered at the load centers and electricity metered at the customers premise. A second tool is the Performance Target and Achievement Agreement (PTA). The PTA defines agreed upon goals for the cooperative in the coming year, and is used to set compensation for managers and define bonus levels for PBS staff. Although similar to Form 550 and MIS in regards to financial and system growth information, the PTA for the first time established base-line information on system maintenance and duration of outages. The PTA is not a top-down performance agreement. Both REB and Comilla take part in negotiating and agreeing to performance targets. PTA's have proven to be of great value in helping to create an awareness of what needs to be accomplished. They are seen as the driving force in keeping the PBS moving forward efficiently and effectively.

Comilla's level of output began modestly connecting between 20-30 customers per day. During their first full year of operation (1981-82) the cooperative connected 5,474 consumers, constructed 677 kilometers of overhead lines, and achieved a system loss of 11.7 percent a very efficient level for a rural electrification system in the developing world.

Critical member service issues encountered during project implementation centered on educating people in the productive use of electricity and overcoming false assumptions regarding its safety. In the operational realm, getting timely connections for Comilla's three substations from PDB presented its own set of challenges. Even though the rural electrification program enjoyed the backing of the government, there was still apprehension on the part of PDB that jobs would be lost due to the start-up of the new cooperative. The resistance of PDB to cooperative expansion continues to be a problem as PBSs take over poorly performing PDB service territories. The loss of jobs is a valid

concern on the part of PDB staff, as PBSs, as a matter of policy, do not hire any ex-PDB personnel due to problems with corruption and poor work practices.

1.3 Impact of the Project

CRE

The impact of reliable and affordable electric service, with rapid coverage to approximately 100,000, persons can be imagined as a healthy contagion spreading across the community. Santa Cruz, Bolivia was a town that in 1969 citizens still had to go out at night carrying oil lamps, and in 1970 televisions, refrigerators, and all fashion of electric appliance were being purchased and installed. A town in where industry suffered for lack of electricity and suddenly had the opportunity of productivity gains offered by unlimited access to reliable power.

Perhaps as important as improved quality of service was the reduction in cost. Even when electricity was available from the old system, it was expensive. With CRE, rates dropped anywhere from 43 to 68 percent due to lower generation costs, longer amortization terms, and higher electric sales, giving quality service and an expanding customer base.

For the first time, the community had 24-hour reliable electric service at affordable prices. Since the establishment of CRE, and while certainly there have been other contributing factors, the Santa Cruz region has grown faster than the rest of the nation, becoming the second most populous city in Bolivia.

During CRE's first decade of operations, Santa Cruz's contribution to the Bolivian gross national product increased 15 percent, while local employment increased 35 percent. Now the Santa Cruz area contributes over 30 percent to the Bolivian gross national product, more than any other region in the country.

The cooperative has now achieved electrification of 75 percent of the population of the Department (their equivalent to "States"). That achievement represents roughly 90 percent coverage of the urban area, 75 percent coverage in semi-urban areas and 33 percent coverage in rural areas. The cooperative's ultimate goal is 100 percent coverage.

Comilla

The impact of rural electrification in the villages and towns of Comilla's service area is nothing short of phenomenal. Statistics showing that 60 percent of all villages are now electrified, 150,713 consumers connected, and 3,648 kilometers of line constructed only begin to tell the story. The rest of the story includes the fact that food shortages were eliminated within four years due to irrigation development made possible by electric motors. Also, cottage industries increased their productivity by 50 percent or more, due to lighting and electric machinery. And last but not least, there was an increase in people's awareness and feeling of self-worth due to the availability of television and other domestic appliances.

The availability of electricity in the household contributed profoundly to increases in income and income generating activities. This in turn allowed greater expenditures on food purchases, health care needs, educational pursuit, and recreational and leisure activities. In agriculture, farmers were now able to plant two crops per year due to irrigation development instead of one, which resulted in a large increase in self-sufficiency. Electricity conquered the night allowing people more time to devote to their families and communities. For example, evening meetings when temperatures are cooler are now possible, promoting greater exchange of ideas and views for the betterment of the community. Before electrification the district of Comilla was mainly agricultural. Today the Comilla service territory is one of the county's most diverse and prosperous. The cooperative's customer mix is 41 percent industrial, 9 percent commercial, 6 percent irrigation, and 44 percent domestic. Poultry farms did not exist in Comilla before electrification, now hundreds are operating with between 1,500 and 2,000 chickens per farm. Large industrial customers such as jute spinners have located in Comilla because of skilled labor and reliable, low cost electrical energy. All of these factors are fulfilling the original promise of electric power, changing the conditions of social and economic life.

The average annual income of rural households in Bangladesh with electricity is 64.5 percent higher than that of non-electrified rural households. Electricity generates employment and there has been a tremendous growth in cottage industries, large industrial sites, and income generating opportunities for women. Rural electrification allowed the rural masses to broaden their knowledge of the world. As a result, the rural population realized, perhaps for the first time, opportunities and choices far beyond their imagination.

PART II: THE PARTICIPATING COOPERATIVES

The second part of this report focuses on the organization of the cooperative, its business operations and its salience in the community.

2.1 Organization and Governance

CRE

The cooperative was founded in 1962, was authorized to provide electric distribution service in 1965, and began operations in 1970. The cooperative was founded with the objective of providing electrical energy service to the urban and rural areas of the Department of Santa Cruz, an objective that has been accomplished by any measure of the original founders but one that today CRE pursues into increasingly remote parts of the service area.

Two parallel bodies elected by the membership, an Administrative Board that hires and directs the General Manager and an Audit Board that hires and directs an internal auditor, govern the cooperative. The two boards work cooperatively to ensure total transparency. In the case of a dispute, the Audit Board has the power to veto a decision of the

Administrative Board. As far as the institutional memory serves those who were interviewed, the use of this veto power has never occurred.

Both the Administrative Board and Audit Board are elected through a system put in place several years ago designed to better represent the membership. Given the large size of CRE it was felt that the annual meetings were becoming somewhat disconnected from the general membership. Certainly no single annual meeting could effectively represent the ideas, contributions and votes of over 270,000 members. As a solution CRE divided the service area into 27 districts, and further divided each district into Sections with each Section representing 2,000 to 3,000 members. There are currently 97 Sections and each elects annually a delegate to the District Board. In turn the District Boards appoint delegates to the annual General Assembly. At this meeting of delegates, representatives are elected to serve on the CRE Administrative and Audit Boards. The system appears to be working, as member participation in annual elections has increased to about 10 percent of the total membership.

Board terms are for two years and are staggered to maintain cohesion. The culture developed at CRE encourages regular rotation of Board members to avoid stagnation and to welcome fresh ideas. A recent by-law change codifies this by imposing a maximum three terms of service. After three terms (six years) the statute does allow for a member to return but only after completing a one-term (two-year) hiatus from the Board. Up until this policy change the longest-serving Board member has served 12 years, but on average board members participate for four years.

The cooperative encourages leadership in the community and personal integrity as key characteristics of those who wish to serve on its boards. Currently the boards are composed of engineers, administrators, businessmen, doctors, and an architect.

As with early days of the cooperative, there is a clear distinction between the board role and duties and those of management. Policy, long term strategic direction and transparency are the focus of the Board. The management and administration of the cooperative is the concern of the General Manager and his staff.

Currently, the General Manager has structured the cooperative into the four major operating divisions: Technology, Administration and Finance, Engineering and Operations, and Commercial. Customer Service, Planning and Budgeting, Public Relations, and Legal units also report to the General Manager. As noted above, the Internal Audit function reports directly to the Audit Board.

The cooperative maintains statements of mission, vision and values. They emphasize the continuing work of sustainable development of the community under the cooperative model, with a focus on the member and the personal and professional development of employees. The values include transparency, teamwork and responsibility.

Government oversight of the cooperative exists only to the extent that all electric utilities in Bolivia are regulated as to rates, tariffs and service quality. While certainly important

to the operation and return of the utility, the governance of the cooperative is largely without oversight and is instead the responsibility of the member-owner.

Comilla

While larger social and economic goals exist, the primary focus of the rural electrification program in Bangladesh is the development, operation and growth of the rural electric infrastructure. As a result, the Comilla mission statement is more objective than subjective. For example, the mission targets administration and operational processes including managing the cooperative on the principle of "no loss, no profit", while maintaining an adequate margin ratio and to provide safe, low cost, and dependable electricity. The rural electrification program has targeted an increase in the quality of life for the rural masses through electric system extension and not through economic development. This has resulted in a purely technical focus versus an integrated approach to rural development.

Comilla's leadership and decision-making process is democratic and responsive to the needs of the members and the cooperative. Decisions that can be supported by the policy manual were made directly by the General Manager. Decisions outside existing policies are placed before the Board for discussion and resolution. REB, from time to time, has also assisted the Board with their decision-making.

Organizationally, Comilla is structured by functions. There are five departments: general services, engineering, construction and maintenance, finance, and member services. In addition to the department heads, an on-site engineering consultant, legal advisor, deputy general manager, and assistant general manager for construction and maintenance support the General Manager. This structure of management has resulted in clear lines of communication, team building, trust, and accountability. Finally, appointment of a Lady Advisor enhanced decision-making at Comilla by assisting the Board to reach decisions that represent the female point of view. Inclusion of women in the boardroom has proven beneficial in promoting the cooperative concept of membership without gender, social, racial, political or religious discrimination. The Lady Advisor also brings a community consciousness to the boardroom.

The value of member participation at Comilla is not to be found in the percentages of attendees at annual meetings, currently averaging 2,000 to 3,000, or three percent of total membership. Instead, member participation is to be found in the lobby of the cooperative and at the cashier's window where roughly 400 consumers a day are personally seen and attended. Member participation can also to be found in the office of the General Manager where at any time a consumer can be escorted in to have tea while discussing their concerns. Members have accepted their roles of cooperative ownership even to the point of reporting illegal connections among their neighbors. Member participation is also evident outside the cooperative office where consumers with concerns or suggestions routinely approach line crews. One lineman reported that they are the biggest complaint department of the cooperative and would not want it any other way. At Comilla, transparency is created by member participation and staff responsiveness.

REB is ultimately responsible for ensuring the viability of Comilla. REB's oversight extends into all areas of operation and management. For example, Comilla's distribution system is actually constructed by REB and turned over to the cooperative for operation. REB can and will initiate organizational changes if it considers necessary, and provides liaison between the PBS and other concerned government agencies. REB's oversight has provided a positive influence in daily operations as well as in management development and with respect to governance issues. There is always the danger that such close supervision by a government agency can become politically motivated, but there is little evidence that this has been a problem in the past.

2.2 Business Operations

CRE

The cooperative is professionally managed and administered with a comprehensive set of policies and procedures as would be expected for any electric utility of its size. The company has embraced technology and maintains an Intranet where any employee can access approximately 30 manuals, rulebooks and program descriptions. The manuals cover topics ranging across engineering, maintenance, operation, outages, inspection, testing, training, safety, service quality, and administration.

The current staff at CRE totals 588 persons with the average length of service topping ten years. The chart below indicates the high level of degreed professionals, representing about two-thirds of all employees.

Labor Category	Percent
Unskilled Labor	17%
Administrative Support	11%
Skilled Technical	7%
College Degree/Professional	37%
Advanced Degree/Professional	28%
Total	100%

Currently 242 of the employees are unionized. Relations with the union have been excellent. Only once in CRE's history did the cooperative suffer a difficult labor struggle. After it was resolved, both parties realized that nothing was gained and that the fate of each party relies on the well being of the other. Since then, there have been no additional problems between the union and management.
For non-union employees the cooperative has a performance evaluation process but pay is not directly tied to performance. Instead, pay is adjusted annually, normally tied to inflation but only if within budget constraints. Pay is competitive with other businesses in the community and with other electric utilities in the nation.

The human resources department administers training programs that are tailored to the specific needs of the operating departments, and as a result the training budget fluctuates.

The current budget year includes about $200,000 for training In a recent year the cooperative spent $100,000 to train sixteen employees in specialized hot line work. Those employees in turn are training their fellow linemen.

The cooperative has a strategic planning process that encompasses all aspects of the business. The process was formalized in 1995. Each plan looks forward five years, and is adjusted annually through a process that requires the involvement of all departments of the company. The planning director estimates that 80 percent of all employees participate in the process. The annual general budget falls out of the strategic planning process to ensure that income targets and expenses are in line with the strategic direction. Performance is monitored at various levels between monthly and annually. Looking back to the first five-year plan (1995), the cooperative estimates that between 90 and 95 percent of its goals were accomplished. The goals and objectives of the plan are constantly promoted and monitored internally. One creative use of the Intranet displays red, yellow and green traffic lights as simple indications of progress on each objective.

Above all, the culture at CRE stresses professionalism and honesty but certainly all is not left to the individual integrity of the staff. Strict policies and checks exist to ensure transparency in cash management, procurement, contracting, and inventory control. Prudent financial management practices have been developed and the cooperative appears to have struck the right balance between carefully shepherding its resources while maximizing its cash management potential.

The cooperative produces monthly financial statements and reports results from the period to the Board. The treasurer of the Board is informed more frequently on an as-needed basis. An outside firm selected by a bidding process, annually audits the cooperative books. The finance staff continuously monitors performance indices, adjusts budgets, and evaluates investments against internal hurdle rates.

Comilla

The business of managing Comilla and selecting personnel responsible for its performance was mapped out in a series of instruction policies developed by REB in 1979. The first set of policies, series 100-300, focused on PBS Engineering and Materials, PBS Finance, and PBS Development and Training. These policies were later expanded in the series 400-800 to cover REB Administration, REB Engineering and Materials, REB Finance and Accounts, REB Training, and REB Board Functions and Assignments. The policies document procedures to follow for any conceivable function regarding the management and operation of an electric distribution cooperative. As an example, PBS instruction policy 200-06 meticulously describes the procedure for the receipt, deposit, and accounting of all funds received by the cooperative. In all, twelve forms were developed to provide the necessary information required to ensure that financial transactions are accurately recorded in the proper accounts. The real value of the PBS Instruction Policy Manual was that it permitted managers and employees to establish well organized, transparent and accountable cooperatives. The development of these instructional policies was a key factor in the success of Comilla.

The budget process for Comilla begins each year in December and continues to June. The process begins with the General Manager and Board Treasurer. Budgets are formulated based on: (a) projected income; (b) projected expenses; (c) identification of unavoidable costs; and (d) capital replacement expenditures. Revenue budgets are sent to the Minister of Power for approval. The Board's finance committee, prior to presentation to the full Board, reviews capital budgets and operating budgets. Once approved by the full Board, budgets are sent to REB for approval. Budget performance is tracked monthly and publicly displayed by simple-to-read bar charts. Budget variance for Comilla averages three percent annually, well within acceptable limits. The cooperative is audited annually by REB's Loan and Audit Department. Independent audits are conducted upon request with the approval of REB's Loan and Audit Director. Throughout the year, the General Manager reviews financial highlights at board meetings. These highlights include purchased power costs, power sold, system losses and their associated costs, expenses and maintenance items of significance, and status of accounts receivable. Comilla's collection rate is consistently in the upper 90 percent range, and is largely due to the high literacy rate of its membership. Financially informed Board Members and Lady Advisors are better prepared to make policy decisions as a result of the General Manager's regular financial presentations.

Transparency and accountability of business affairs at Comilla are achieved by adhering to detailed instruction policies, open budgetary process, monthly financial reporting, performance target agreements, informed board members, and a prevailing management philosophy of empowerment, delegation, and customer service.

One final factor that many local authorities believe contributed to the smooth development of the cooperative was prohibiting organized labor. The government recognized early on that a total effort by all participants was needed to bring electricity to the rural masses as quickly and economically as possible. By act of Parliament, unions and collective bargaining agreements were not permitted at electric cooperatives.

2.3 Salience

CRE

The history of CRE bringing affordable and reliable electric service to a community that waited so long suggests obvious conclusions about the salience of the cooperative to the community. This is a story that still repeats itself today as new construction reaches more and more new rural consumers. For existing customers, however, as the decades pass and new generations take for granted the existence of public services, the cooperative strives to maintain awareness among members of its mission and value.

CRE does this by providing excellent service and through continuous member relations and community donation programs. Instead of distributing member capital credits, which to all but the industrial consumers would amount to very little, the cooperative has long opted to make community donations. These might include equipment for a local firehouse, a civic organization, or a rural public service entity. The cooperative has

developed an extensive scholarship program and sponsors various courses as well as a leadership development program.

Regular internal surveys as well as those conducted by third parties allow CRE to monitor their customer service performance and image in the community. The cooperative consistently performs well. An independent survey published in June of this year shows CRE leading the nation with an overall index of customer satisfaction at 82 percent. The average of all utilities was 64 percent. In another study of customer satisfaction of electric utilities across nine South American countries, CRE placed overall in second place. Another recent study of image among the membership gave CRE an overall score of 3.79 on a scale of 1 to 5. Monitoring and analysis of customer service representatives consistently result in scores in the high 90 percent range.

Other performance measures regarding service connections are hard evidence of why satisfaction levels remain high. For example, while regulations in Bolivia allow up to five days for an electric utility to complete new connections, CRE on average connects new services within 24 hours. Reconnections are performed on average in two hours.

Large commercial and industrial customers are cared for under a key accounts program in where large loads are assigned a personal representative. Any issue or problem is resolved rapidly and on an individually tailored basis.

Underlying the customer service programs and high levels of satisfaction that result is a pervasive attitude of openness and a focus on the member-client. It is perhaps one of CRE's greatest achievements that it has been able to maintain from its earliest days, a culture of keeping the doors and books always open, and bringing the cooperative to the community as opposed to waiting for the reverse.

Comilla

The value of rural electrification to the people in Comilla's service territory has been profound. Access to electricity has had far reaching impacts on the lives and the meaning of life for the rural masses. Significant improvement in the areas of poverty reduction, income growth, agricultural, industrial and commercial development, health, education, and female empowerment were achieved by the productive use of electricity. On an individual level, rural electrification serves as a catalyst for the involvement and organization of people. This fostered a high level of self-awareness and feeling of pride and self-worth in people. For the first time, rural dwellers were on the same technological level as urban dwellers with all the benefits and responsibilities technology brings.

Becoming a member of the cooperative meant social importance. Households could devote more time to educational and community pursuits resulting in an increase feeling of self-esteem. Marriages were being arranged according to which households had electricity. For example, parents looking for suitable daughter-in-laws or son-in-laws would inquire if electricity were connected to the household of their potentially new family member.

The development of Comilla not only brought electricity to the people, it established a customer-owned cooperative which helped organize and unite people in a way no other government program, non-government organization, business, or religious organization could. Through grass-root implementation of the seven cooperative principles [of voluntary and open membership, democratic member control, member's economic participation, autonomy and independence, education, training and information, cooperation among cooperatives, and concern for community], the rural masses perhaps saw for the first time a better future for their children. One only had to travel down a county road in Bangladesh where homes and shops are dimly light by kerosene lamps and then travel an electrified road to appreciate the salience of electrical energy in human development.

Electrification changed everything for the business community. Small cloth weavers no longer ceased full production after sunset. Instead of choosing between weaving cloths into garments and dyeing cloth, both functions now operate simultaneously. Poultry farms did not exist in the Comilla service territory prior to electrification. Today, numerous small to medium size poultry farms can be found throughout the service territory. Large industrial plants were unheard of in rural Bangladesh. Many have commenced operations, e.g. jute spinners bring with them good job for thousands of members and non-members alike.

PART III: LESSONS LEARNED

The third part of this report focuses on lessons learned. We cannot generalize with certainty key contributors of success from a study of only two cooperatives, but the case studies had interesting commonalities that we suspect might be found in many successful cooperatives. Sections 3.1 and 3.2 reflect lessons learned from the combined experience of CRE and Comilla. In Section 3.3 the perspective of each cooperative is detailed.

3.1 Project Implementation Phase

- There must exist both a clear need for creating a cooperative and an enduring will on the part of the users to make it work as the necessary means for satisfying that need.

- Leaders who can articulate a vision and motivate people to support and join the cooperative must drive the effort.

- There must be a sufficient level of economic viability for the cooperative to succeed, through a combination of population density and also a critical amount of non-residential energy demand (measurable existing or suppressed demand).

- Activities must begin and always be directed by detailed and skilled organization and planning on the part of the cooperative staff and through the experience of advisors.

- Low cost financing must be available, preferably with a grace period. The high capital cost of constructing an electric system requires a long amortization period at low interest rates. The lower the density and usage levels, the greater need for low cost money.

- Cooperative members must contribute funds in aid of construction and to develop a capital source independent of outside financing. While member contributions are unlikely to defer significant amounts of initial financing, they do represent a commitment and over time can help finance incremental system expansion.

- There must be both the availability of experienced assistance and the willingness to accept it. Again, without one the other is of little value. This brings not only technical advice but also practical know-how to the local project developer.

- The foundation of the cooperative must include community leaders that bring to the project only a focus on service to the member-user and no agenda of personal gain. The involvement of local leadership dedicated to local community betterment indicates the priority of electrification in the community.

- Significant positive social and economic development cannot come without the availability of an electric system to power it.

3.2 Operational Phase

- There must be a clear line separating the policy role of the Board and the administrative role of management. Mixing politics and business rarely produces results beneficial to the membership.

- There must be regular change within the governing leadership to maintain focus on service to the cooperative and not on personal agendas. With new people, it is easier to develop fresh ideas and maintain a spirit of service to the community.

- There must be a continuous focus on the member as well as outreach programs to encourage as high a participation level as possible. The cooperative is a democratic entity and without member participation, the cooperative spirit is difficult to maintain.

- Constant and effective communication is paramount. The open and honest exchange of information leads to knowledge, which leads to understanding between the cooperative and consumer-owners.

- The cooperative must develop a dedicated professional staff. Keys to maintaining the staff include competitive pay, training, and communication of the cooperative mission, vision and values.

- The cooperative must maintain efficient operations and continuously demonstrate efficient use of member resources. This is fundamental to good relations with the membership.

- The cooperative must maintain not only good relations with its membership but strong ties to the community, national government, and industry both domestically and internationally. Open lines of communication and strong relationships allow for the possibility of support when needed in times of crisis.

- Members should be recognized for their contributions to the success of the cooperative and this linkage between management and member should be promoted.

- In the two case studies, the role of governmental oversight is vastly different and at first it seems difficult to identify a single guiding principle in this regard. The Bolivian experience suggests that a lone electric cooperative relying on self-governance can flourish if a number of factors are favorable, such as the economic potential and population density of the service area. The failure of this model in places where the factors have not been so favorable does seem to indicate the importance of the Bangladesh experience, which suggests that when tackling rural electrification on an organized national scale, strong oversight and support authority is a positive aspect of program success.

3.3 Participant Perspective

CRE

CRE acknowledges that the initial assistance of NRECA was fundamental to its establishment. Technical assistance allowed CRE to avoid having to reinvent the wheel. NRECA brought complete engineering and construction standards, along with real-world experience, procedures, policies, vendor contacts, etc., in literally every area of electric cooperative operations and management. Interestingly however, this was not the only benefit described by the founders interviewed. They commented that the NRECA advisors also represented a source of moral support that provided comfort that they "were not alone."

The sister cooperative relationship with a U.S. co-op is also highly valued by CRE. A CRE manager noted that the exchange of ideas and information between the two cooperatives has helped CRE personnel to visualize how they might implement similar initiatives at CRE.

While CRE remains grateful to this day for the key assistance NRECA provided in the development of the cooperative, CRE has certainly long since been the master of its own destiny. It is interesting to read the original incorporation acts, feasibility studies and first planning documents. One particularly accurate and prophetic quote merits reproduction here. In a 1964 socio-economic study of the Santa Cruz target region performed by the founding board, CRE concluded that the population was "psychologically oriented with a

spirit of free will and democracy" and that the analysis demonstrated a "palpable possibility of massive economic growth in the region due to the influence of CRE."

Comilla

The founders, managers, employees, and consumers of Comilla voiced many common perspectives on the lessons learned in founding, managing and expanding the cooperative.

First among these were the integrity, leadership and skills of the founders and managers. This was a group of honest, devoted people who believed in the rural electrification program and whose total commitment resulted in successful implementation of the program. This includes the first REB chairman who was well respected and well connected to the government. The initial General Manager of the cooperative was an experienced business manager.

The focus was first and always on the member-consumer, which kept the entire staff on the same page and opened the cooperative to all who made application as eligible for connection. There was power and progress found in a diversified membership and staff, including the early decision by the REB Chairman to hire women. Motivational and informational meetings were numerous and as a result the community accepted their role and responsibility in cooperative ownership.

Training in the United States provided PBS and REB management the opportunity to visualize the big picture and realize what needed being done. The availability of experienced advisors increased the pace at which progress could be made. The availability of low-cost financing ensured that equipment and materials were in place when needed. The existence of good roads and communications in the construction areas was also important.

The development of, and strict adherence to, policies helped discipline the cooperative and orderly growth was achieved through establishing Performance Target Agreements. The cooperative practiced bottom-up management and ethical behavior was expected from Board of Directors. This created a high sense of purpose for both the board and employees.
From the point of view of the participants, rural electrification is "peoples' power". To understand Bangladesh's rural electrification program achievements is to understand the value of having adequate resources, dedicated and honest leadership, and the desire to work without distinctions of class to create a mechanism that serves and uplifts the entire community including the poor.

PART IV: FINANCIAL ANALYSIS

The analysis of the financial strength of the two electric cooperatives was accomplished by collecting historical financial statements and performing ratios analysis. In both cases, it was determined that reliable and consistently reported data was available for the most recent nine-year period, from 1994 through 2002. The summary data for CRE is included as Appendix A, and for Comilla as Appendix B.

4.1 Trend Analysis

Indices representative of cooperative liquidity, solvency and profitability were calculated for each year in the historical period. The various ratios are compared in this section against industry targets and the cooperatives' performance over time.

Liquidity

CRE

The cooperative is very strong in all categories of liquidity. The Working Capital ratio industry target is 10 percent or greater and CRE is currently at 48 percent; it has never been lower than 29 percent and at its peak in 1998, was at 63 percent. The target for Current Ratio is above 1.5 and CRE is currently at 4.3, near its historical peak, with a low of 2.1 for the nine-year period. The cooperative had negative operating years in 1994 and 1995, and once again last year, in 2002. During each of these negative years, the indicators of Modified Debt Service Coverage and Times Interest Earned were also negative. On all other years, these ratios indicated a performance well above the industry target of 1.35. On the stricter of the two, Times Interest Earned values ranged from 3.9 to 6.2. On the broader indicator of Modified Debt Service Coverage, values ranged in positive years from 8.4 to 30.7. The large difference between the two indicators is that Modified Debt Service Coverage considers both non-operating margins and the non-cash expense of depreciation, neither of which are included in the calculation of Times Interest Earned. In recent years, CRE has generated more in non-operating margins than from operating margins. The cooperative derives its non-operating margins largely from interest earned on investments. This has carried the cooperative through lean operating years but obviously cannot be relied upon in the long term. The final liquidity indicator is Days Sales in Receivables, with an industry target of less than 90 days. With the exception of the first year in the analysis period, 1994, the cooperative has consistently performed close to but under 90 days. This indicates that receivables are being managed and collected within an acceptable timeframe.

Comilla

Over the nine-year analysis period, the cooperative has consistently performed strongly across all liquidity ratios. The cooperative's Working Capital ratio is most recently at 65 percent and has ranged from a low of 63 percent to a high of 142 percent (due to a cash buildup over the 1995-1999 period), compared to the industry target of 10 percent or greater. The Current Ratio industry target is greater than 1.5 and Comilla has consistently had a ratio of current assets over liabilities between 4 and 5.5. Comilla's performance as measured by the Modified Debt Service Coverage has ranged from about 2 to 3.5 as compared to the industry target of 1.35. The Times Interest Earned ratio also carries a target of 1.35 and Comilla has consistently performed at a ratio of just under 3 to just under 6. Days Sales in Receivables has consistently ranged in the 50 to 60 day range, well under the industry target of 90 days and an indicator of strong receivables management. In all indicators of liquidity Comilla has for a nine-year period, it has shown strength and consistency in managing its current financial responsibilities, with ratios far exceeding industry targets.

Solvency

CRE

The first ratio in this category is Collection Efficiency. The target is 95 percent or greater, and while data was not available to calculate the ratio, observations of collections and disconnection practices suggest the cooperative has a high performance in this category. The System Losses percentage provides an indication of operating efficiency and carries a very real financial cost to the utility. The industry target is 15 percent or less and CRE has consistently operated with System Losses in the very healthy range of 8 to10 percent. The Ownership Percentage indicates the portion of the cooperative assets that are owned by the cooperative, with an industry target of 20 percent or better. For CRE, this percentage has been steady over the analysis period in the 75 to 85 percent range. This unusually high level is because the cooperative has developed significant cash resources that have allowed it to grow with internal resources and avoid higher cost external debt. The dependence on internal cash versus debt is the same reason why the next indicator, the Leverage Ratio, approaches zero while the industry average is a ratio of about 2 to 1. For the indicator of Write-offs as a % of Revenue, CRE currently performs at below one percent (industry target is under five percent) and the trend over time indicates this has been an area of focused efficiency for the cooperative. The final indicator in this section is Days Sales in Payables, which is another area of recent efficiency improvement for CRE. The industry target is under 45 days and CRE is currently at 25 days.

Comilla

The industry target for Collection Efficiency is 95 percent or greater of billed sales; Comilla has averaged 97 percent for nine years. The target for System Losses is 15 percent or less, and with the exception of 2000 (16 percent) and 2001 (15 percent) the cooperative has shown system losses of 10 to 12 percent. The high years were likely due to the absorption of inefficient system from the PDB. The Ownership Percentage for Comilla, which reflects margins and equities as a percentage of assets, has ranged tightly between 32 and 35 percent. While this is significantly lower than that of CRE, the figure for Comilla is much closer to but still above the industry target of 20 percent. Comilla's ownership percentage is tied to a higher and more typical use of debt financing than CRE. This is reflected in Comilla's Leverage Ratio, which is above the industry target of 2 to 1 or greater, and has steadily increased from about 5 in 1994 to 9.5 in 2001 and then leveled in 2002 to 9.4. This reflects an increase in long-term debt relative to member equity. Write-offs as a Percentage of Revenue carry an industry target of under five percent, and Comilla is consistently under one percent. The target for Days Sales in Payables is under 45 days and Comilla typically ranges from 29 to 31 days. Days Sales in Payables increased to a high of 50 over the years 1999 to 2001 but returned to the average of 30 days in 2002.

Profitability

CRE

The profitability of CRE over the nine-year period examined has been low, with the Return on Sales ratio ranging from a low of negative four percent to high of six percent. Industry targets for this indicator are above five percent. While still operating at low levels of profitability, CRE improved from the two negative years of 1994 and 1995 and at least showed a positive Return on Sales or better until the most recent year. A combination of tariff restrictions and economic crisis resulted in a basically breakeven operating year in 2002. Return on Equity and Return on Assets have likewise been low for CRE, in most years well below the industry targets of 10 percent and 8 percent or better respectively. CRE shows a rate of return on total capitalization (Capital Cost to Total Capitalization) below the industry target of 10 percent or under, declining from a high of seven percent to an average of two percent in recent years. This again is a result of low leverage due to the unavailability of affordable debt. During the period of the cooperative's peak financial performance, 1996 to 1998, this ratio ranged from five to seven percent, which is an indication of more balance between debt and equity funds. The two final indicators of profitability and efficiency are the Labor to Gross Income Ratio and the Power Cost as a Percentage of Income. The industry target for the Labor to Gross Income Ratio is under 25 percent and CRE has shown a trend of continuous improvement from a high of 18 percent to the current level of 10 percent. The industry target for Purchase Power Cost as a Percentage of Income is over 60 percent, indicating that all other operating and overhead costs are not more than 40 percent of operating income. CRE has steadily performed at 50 to 55 percent, slightly below industry targets.

Comilla

The profitability of Comilla over the nine-year analysis period has been strong. Return on Sales is currently at nine percent, above the industry target of five percent, and has historically ranged from nine to 18 percent, with the exception of 2001 and 2002. Return on Sales dropped to five and six percent during this period as expenses increased and margins dropped sharply during these two years, only to recover in 2002. The industry target for Capital Cost to Total Capitalization is as low under 10 percent as possible while maintaining other financial ratios. Comilla strikes a good balance in the use of equity and debt funds and performs in the range of four to seven percent. The industry target for Return on Equity is 10 percent or better. With low margins in 2000-2001 Comilla performed in the eight to nine percent range, but in all other years Return on Equity ranged from 11 to 16 percent, and is currently at 15 percent. The industry target for Return on Assets is eight percent or better and unlike its return on equity and sales here Comilla is below the target performing in the range of two to four percent. In efficiency indicators Comilla performs better than industry targets. The target for Labor to Gross Income is under 25 percent and Comilla shows a generally improving trend from five percent in 1994 to three percent in 2002. Comilla operates in an extremely inexpensive labor market. As for Purchase Power Cost as a % of Income with a target of 60 percent or higher, Comilla has performed with generally increasing efficiency from 56 percent in 1994 to 69 percent in 2002.

4.2 Financial Sustainability

A determination of the financial sustainability of a cooperative is above all a report card on historical performance, an examination of competition, regulation and other factors affecting the industry, and an estimation of management's ability to negotiate a successful path into the future.

CRE

While historical performance on profitability has been low, ratios for liquidity and solvency are all very strong. The cooperative has built up large internal resources. This has been driven by its growth and new membership assessments ($410 per member) and wise investment of past margins. Already for many years a very large cooperative, annual customer growth in the 1994 to 1999 period ranged from eight to nine percent and sales growth over the same period ranged from eight to 12 percent annually.

However since 2000 customer growth has slowed to three to four percent annually and sales growth has stagnated. This means that both customers are being added to the system more slowly and that average use per existing customer has been in decline. This coincides with a severe economic downturn nationally. Over the same period the regulated tariffs for wholesale and retail power have diverged in a way that imposes a financial squeeze on CRE as well as the other distributors in the country. Wholesale rates are tied to the dollar and have been rising while retail rates tied to falling domestic inflation have been dropping.

CRE is responding to the current financial situation with sensible initiatives. In response to the slow economy and dip in income the cooperative reduced its current year budget by approximately 5 percent from the prior period. Additionally it is aggressively continuing its new connections, currently adding about 1,000 new customers per month. Given the cooperatives' significant equity reserve it is able to finance the cost of new connections internally thereby increasing sales without adding to debt service. Finally the cooperative along with other distributors are developing new tariff proposals to the government that if accepted will ease or erase the disparity created by the regulated calculation of wholesale power cost on the one hand and retail rates on the other. Already, partial numbers for the year 2003 show an improved performance over 2002.

From the industry perspective the future portends little risk. The electricity delivery that CRE provides is a basic public service with little viable competition from alternative energy sources or industrial self-generation. There is some possibility of limited migration off the system of large unregulated industrial load but this risk is considered minimal. This is because leaving the system would require an involved application process and significant expenditure on connection, safety and monitoring equipment on the part of the industry. At the moment the delta between retail rates and self-generation costs is not a sufficient incentive to self-generation, and service reliability is not an issue.

The cooperative has both strong general and financial management teams and while huge equity reserves will continue to carry CRE through lean years, the leadership is well aware that this cannot continue into the long term. Challenges to financial sustainability

include increasing operating profitability in an environment of slow growth, developing low cost debt sources, and extending service into the remaining remote areas of the Department on an economically viable basis.

Comilla

The cooperative has demonstrated consistently strong financial performance in all categories – liquidity, solvency and profitability. With the exception of a slight dip in the year 2000, revenues have increased rapidly over the analysis period at the average annual rate of 15 percent. Revenue growth in the most recent two years accelerated to an average of 30 percent per year due to both the rapid addition of new customers and an increase in usage per customer. Comilla has earned the bulk of its margins from operations, typically showing a low double-digit return on sales. At the same time the cooperative has maintained a steady contribution to margins from investment income, suggesting prudent cash management. If Comilla continues to be able to fuel growth with a balance of equity and affordable debt while maintaining its historical level of return on sales, the cooperative will continue its financial strength into the future. There are no indications on the horizon that this is not achievable.

Competitive risk to Comilla's market from gas or alternative energy is small but does exist. The risk is viewed as minimal as long as sufficient levels of energy supply are procured, reliability is maintained or improved, and rates are kept competitive. It is conceivable that recent marketing efforts by the gas industry may encourage industrial customers to look at self-generation but this is potentially economical only for a very small percentage of the customer base. Expected continued solid growth in the residential and commercial markets should mask any small loss in the industrial sector. The current regulation scheme allows for wholesale rates set by the government and individual PBS rates set by the cooperative. There is discussion of the government setting up an independent regulatory board to set electric and gas rates but given the responsibility of such boards to balance the interests of the consumer and the utility, little net impact is expected at the PBS level.

As with all other external and internal challenges Comilla has shown a historical ability to chart the right course. The current Board and management of Comilla are expected to continue operating the cooperative with the same level of foresight and prudence that previous leadership has demonstrated. The existence of the REB oversight including their ability to affect changes in PBS leadership is an added measure of security to Comilla's financial sustainability.